



**Pb-free
HEAT**



1102W Series

Single color Inner-lens Type
(High Reliability type, V-Series)

Product features

Package	3216 fixed Inner-lens type, Water clear epoxy
Product features	<ul style="list-style-type: none"> • Outer Dimension 3.2 x 1.6 x 1.5mm(L x W x H) • Wide operation temperature range. Storage Temperature : InGaN : -40°C~110°C : AlGaInP : -40°C~120°C Operating Temperature : -40°C~100°C Operation Guarantee • Ramification of luminosity group sorting. It is possible to have a uniform transmission with little irregularities even when several are lined up. • Systematization of luminosity groups and color tone groups. Unified to a simple standard. • Corresponding to a use requiring high reliability in cars etc... • Shape resin into an inner lens to make high luminosity possible. • Corresponding to reflow soldering, dip soldering, and manual soldering. • Lead-free soldering compatible • RoHS compliant
Dominant wavelength	Blue : 470nm (VUB) Green : 530nm (VUG) , 562nm(VYBG) Yellow Green : 572nm (VYPY) Yellow : 590nm (VFY) Orange : 605nm (VFA) Red : 615nm (VFV) , 626nm (VFR)
Spatial distribution	VUB,VUG : 50deg. VYBG,VYPY,VFY,VFA,VFV,VFR : 60 deg.
Die materials	VUB,VUG : InGaN VYBG, VYPY, VFY, VFA, VFV, VFR :AlGaInP
Optical efficiency	VUB : 13.3lm/W VUG : 30.3lm/W VYBG : 1.2lm/W VYPY : 3.8lm/W VFY : 13.2lm/W VFA : 13.2lm/W VFV : 14.7lm/W VFR : 13.2lm/W
Rank grouping parameter	Sorted by luminous intensity and wavelength and taped according to rank.
Assembly methods (customer)	Corresponding to surface mounter.
Soldering methods	Corresponding to reflow soldering and manual soldering.
Taping dimensions	2,500pcs(standard) per reel in a 8mm width tape. Reel diameter : ϕ 180mm
ESD	AlGaInP:2kV (HBM) InGaN:1kV (HBM)

Recommended Applications

SW lighting for car indicators, meter panel, car audio and heater control, etc...

Color Variations and Luminous Intensity

(Ta=25°C)

Part No.	Material	Emitted Color	Lens Color	Dominant Wavelength		Luminous Intensity			Luminous Flux	
				λd (nm)		I_v (mcd)			ϕv (lm)	
				TYP.	I_f	MIN.	MAX.	I_f	TYP.	I_f
VUB1102W	InGaN	Blue	Water Clear	470	10	47	180	10	440	10
VUG1102W	InGaN	Green		530	10	150	560	10	1,000	10
VYBG1102W	AlGaInP			562	20	15	68	20	50	20
VYPY1102W	AlGaInP	Yellow Green		572	20	47	180	20	160	20
VFY1102W	AlGaInP	Yellow		590	20	120	470	20	500	20
VFA1102W	AlGaInP	Orange		605	20	120	390	20	500	20
VFV1102W	AlGaInP	Red		615	20	220	680	20	560	20
VFR1102W	AlGaInP			626	20	120	470	20	500	20

※Note : The luminous intensity(I_v) and dominant wavelength (λd) above are the setup values of the sorting machine.

(Tolerance : I_v ... $\pm 10\%$, λd ... ± 1 nm)

Absolute Maximum Ratings

(Ta=25°C)

Item	Symbol	Absolute Maximum Ratings								Unit
		VUB	VUG	VYBG	VYPY	VFY	VFA	VFV	VFR	
Power Dissipation	P_d	84	84	81	81	78	78	78	78	mW
Forward Current	I_F	20	20	30	30	30	30	30	30	mA
Pulse Forward Current ※1	I_{FRM}	48	48	100	100	100	100	100	100	mA
Derating (Ta=75°C or higher)	ΔI_F	0.40※2	0.40※2	1.0	1.0	1.0	1.0	1.0	1.0	mA/°C
	ΔI_{FRM}	0.96※2	0.96※2	3.33	3.33	3.33	3.33	3.33	3.33	mA/°C
Reverse Voltage	V_R	5	5	5	5	5	5	5	5	V
Operating Temperature	T_{opr}	-40~+100								°C
Storage Temperature	T_{stg}	-40~+110			-40~+120					°C

※1 I_{FRM} Measurement condition : Pulse Width \leq 1ms., Duty \leq 1/20.

※2 Temperature Condition: Ta=60°C or higher.

Thermal Characteristics

Item	Symbol	Ratings								Unit
		VUB	VUG	VYBG	VYPY	VFY	VFA	VFV	VFR	
Junction Temperature (MAX.)	T_j	110	110	120	120	120	120	120	120	°C
Thermal Resistance (TYP.) (Junction/ ambient)	$R_{(thj-a)}$	600	600	700	650	650	650	650	650	°C/W
Thermal Resistance (TYP.) (Junction/ Solder Point)	$R_{(thj-s)}$	400	400	500	450	450	450	450	450	°C/W

※ $R_{(thj-a)}$ Measurement Condition / Substrate: FR4(t=1.6mm) Pattern Size: 16mm².

Electro-Optical Characteristics (VUB,VUG)

(Ta=25°C)

Item	Conditions	Symbol	Characteristic Ratings			Unit
			VUB	VUG		
Forward Voltage	I _F =10mA	V _F	TYP.	3.3	3.3	V
			MAX.	3.8	3.8	
Reverse Current	V _R =5V	I _R	MAX.	100	100	μ A
Peak Wavelength	I _F =10mA	λ _p	TYP.	465	530	nm
Dominant Wavelength	I _F =10mA	λ _d	TYP.	470	525	nm
Spectral Line Half Width	I _F =10mA	Δλ	TYP.	26	35	nm
Half Intensity Angle	I _F =10mA	2θ 1/2	TYP.	50	50	deg.

※Note: The dominant wave length (λ_d) above is the setup value of the sorting machine.
(Tolerance : λ_d...±1nm)

Electro-Optical Characteristics (VYBG, VYPY, VFY, VFA, VFV, VFR) (Ta=25°C)

Item	Conditions	Symbol	Characteristic Rating							Unit
			VYBG	VYPY	VFY	VFA	VFV	VFR		
Forward Voltage	I _F =20mA	V _F	TYP.	2.1	2.1	1.9	1.9	1.9	1.9	V
			MAX.	2.5	2.5	2.4	2.4	2.4	2.4	
Reverse Current	V _R =5V	I _R	MAX.	100	100	100	100	100	100	μ A
Peak Wavelength	I _F =20mA	λ _p	TYP.	565	572	592	609	624	635	nm
Dominant Wavelength	I _F =20mA	λ _d	TYP.	562	572	590	605	615	626	nm
Spectral Line Half Width	I _F =20mA	Δλ	TYP.	15	15	15	15	15	15	nm
Half Intensity Angle	I _F =20mA	2θ 1/2	TYP.	60	60	60	60	60	60	deg.

※Note: The dominant wave length (λ_d) above is the setup value of the sorting machine.
(Tolerance : λ_d...±1nm)

Luminous Intensity Rank

(Ta=25°C)

Standard Chart (Unit: mcd)

Rank	I _v (mcd)		VUB	VUG	VYBG	VYPY	VFY	VFA	VFV	VFR
	MIN.	MAX.	I _F =10mA		I _F =20mA					
AZ	8.2	10								
B1	10	12								
B2	12	15								
B3	15	18			B3					
B4	18	22								
B5	22	27								
B6	27	33								
B7	33	39								
B8	39	47								
B9	47	56	B9			B9				
BX	56	68			BX					
BY	68	82								
BZ	82	100								
C1	100	120	C1							
C2	120	150					C2	C2		C2
C3	150	180	C3	C3		C3				
C4	180	220								
C5	220	270							C5	
C6	270	330								
C7	330	390						C7		
C8	390	470					C8			C8
C9	470	560		C9						
CX	560	680							CX	
CY	680	820								
CZ	820	1,000								
D1	1,000	1,200								
D2	1,200	1,500								
D3	1,500	1,800								
D4	1,800	2,200								

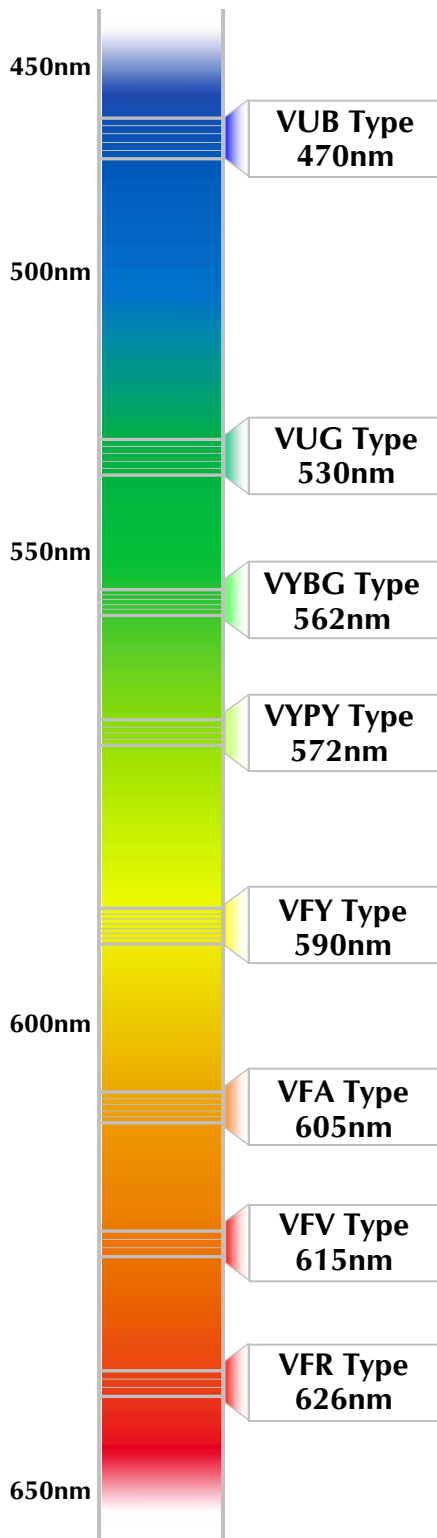
※ Limited width of luminous intensity rank is from Min.4 rank width.

Color Tone Groups (λ d)

(Ta=25°C)

(unit: nm)

Tolerance: +/-1nm



VUB Type (I_F=10mA)

	A	B	C	D
MIN.	460.0	464.0	468.0	472.0
MAX.	464.0	468.0	472.0	476.0

VUG Type (I_F=10mA)

	A	B	C	D
MIN.	515.0	520.0	525.0	530.0
MAX.	520.0	525.0	530.0	535.0

VYBG Type (I_F=20mA)

	B	C	D
MIN.	555.0	558.0	561.0
MAX.	558.0	561.0	564.0

VYPY Type (I_F=20mA)

	A	B	C
MIN.	567.0	570.0	573.0
MAX.	570.0	573.0	576.0

VFY Type (I_F=20mA)

	C	D	E	F
MIN.	583.0	586.0	589.0	592.0
MAX.	586.0	589.0	592.0	595.0

VFA Type (I_F=20mA)

	A	B	C	D
MIN.	597.0	600.0	603.0	606.0
MAX.	600.0	603.0	606.0	609.0

VFV Type (I_F=20mA)

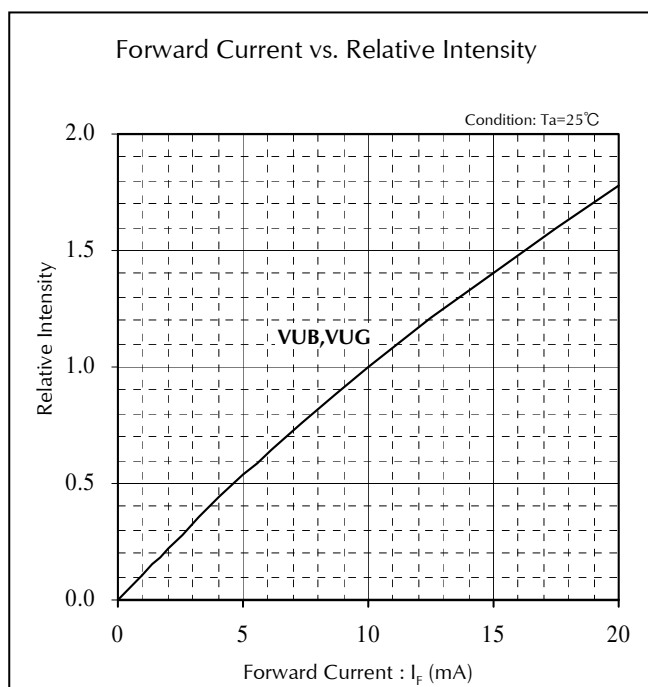
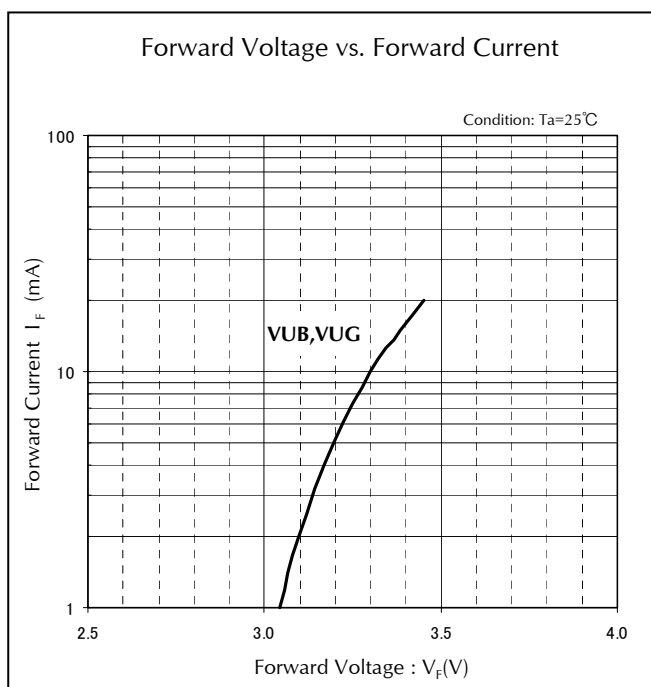
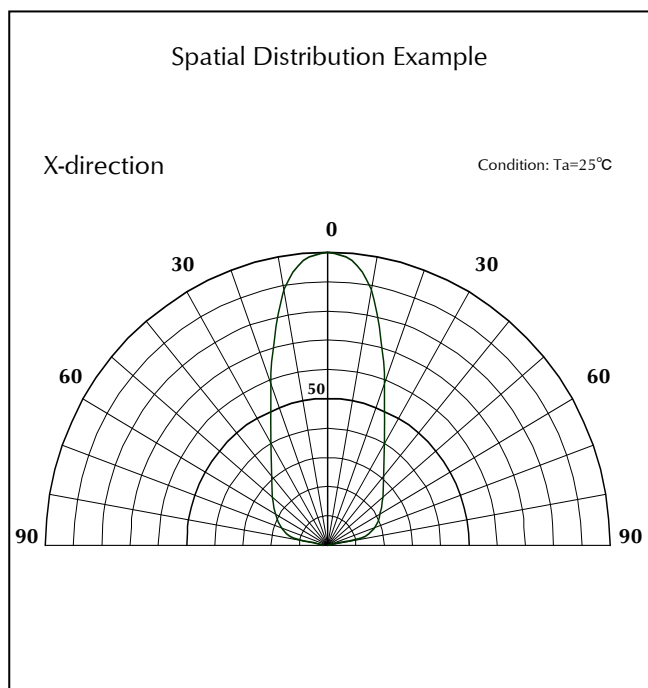
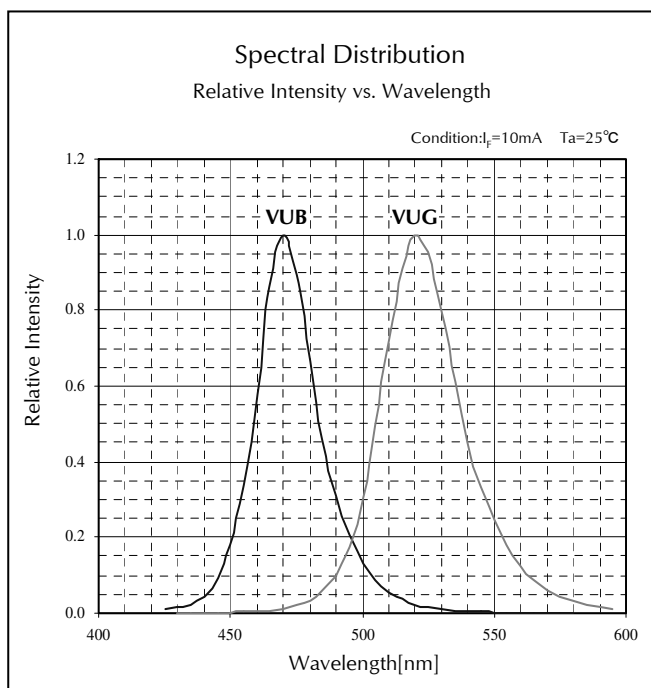
	B	C	D
MIN.	613.0	616.0	619.0
MAX.	616.0	619.0	622.0

VFR Type (I_F=20mA)

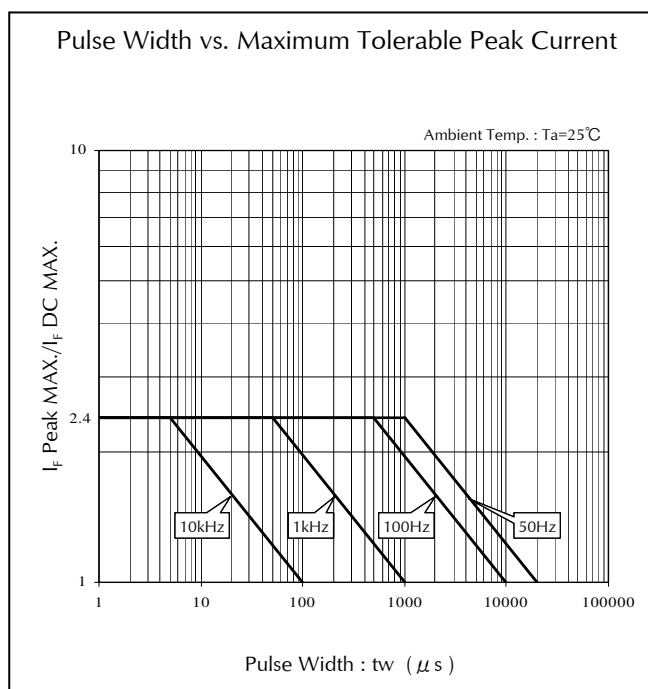
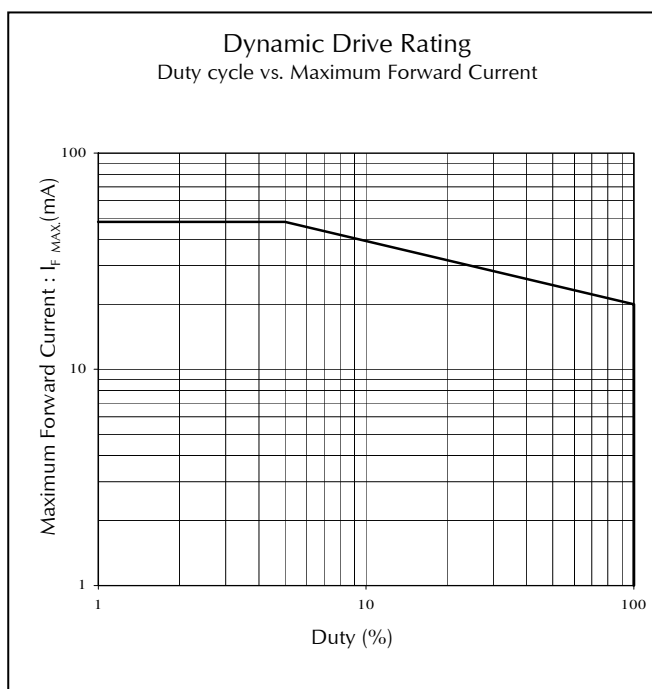
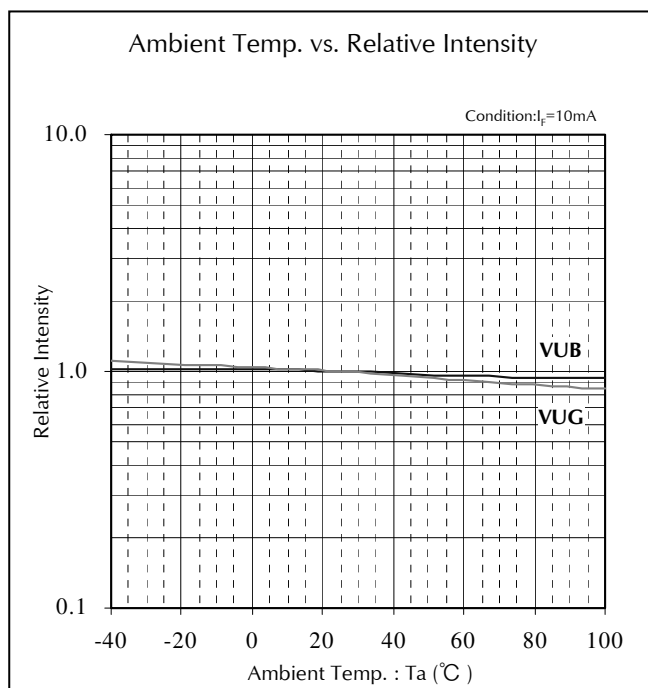
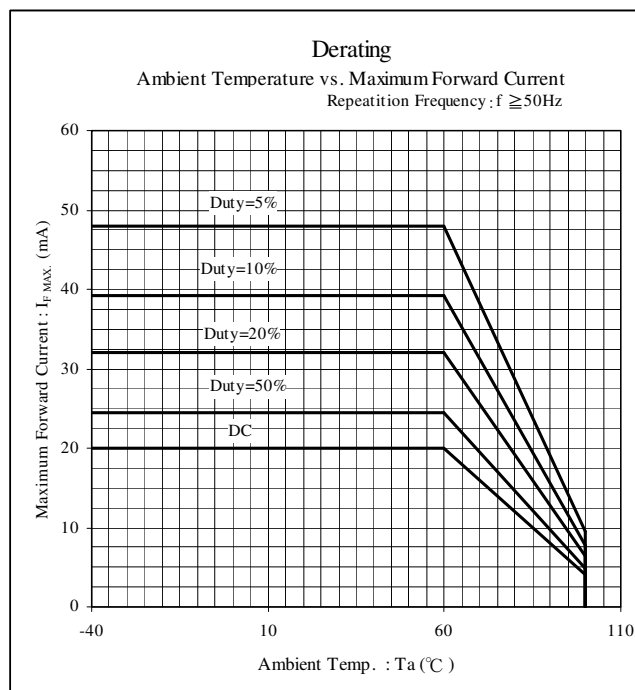
	A	B	C
MIN.	620.0	626.0	632.0
MAX.	626.0	632.0	638.0

※Limited width of color tone rank is from Min.3 to Min.4 rank width.
(It changes with product.)

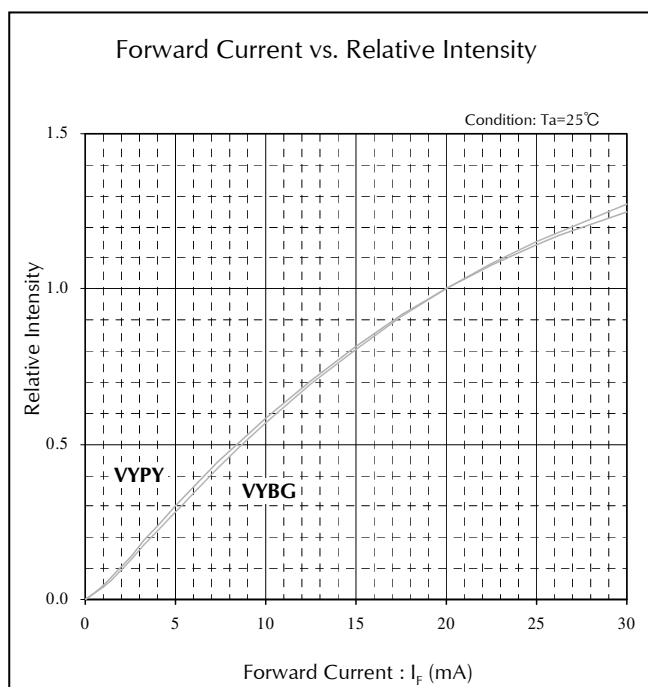
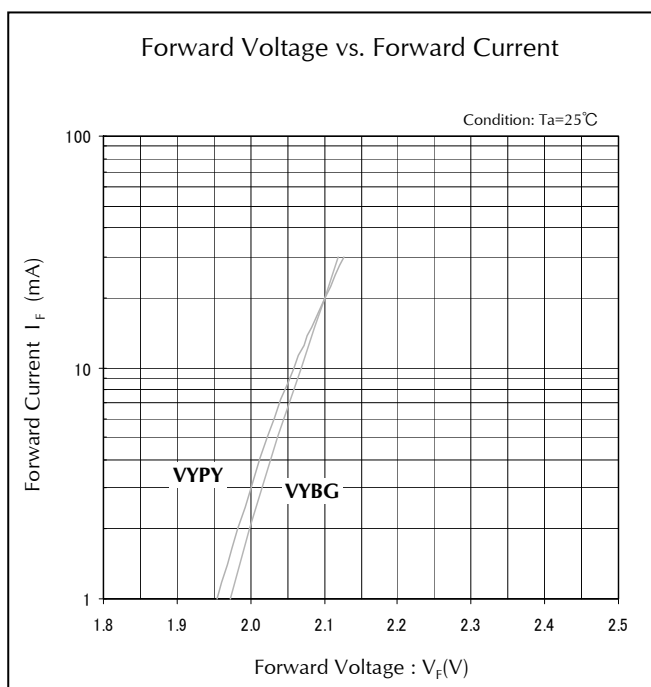
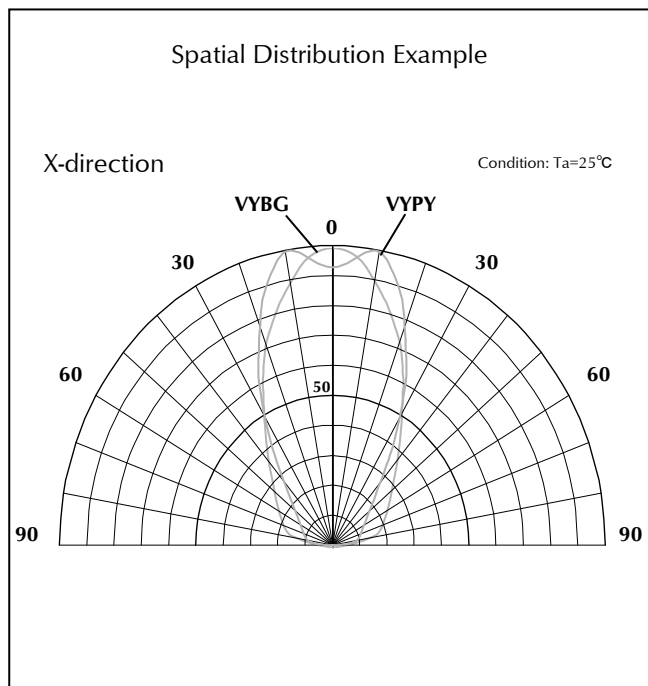
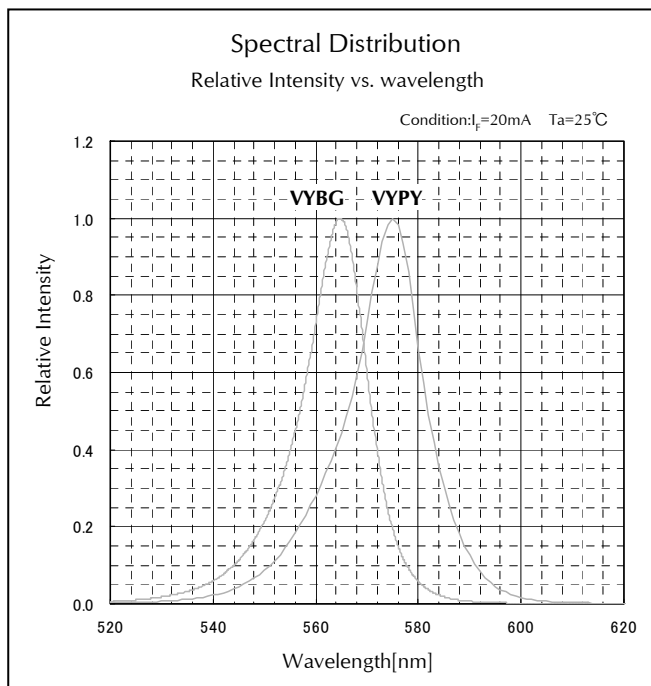
Characteristics Chart (VUB,VUG)



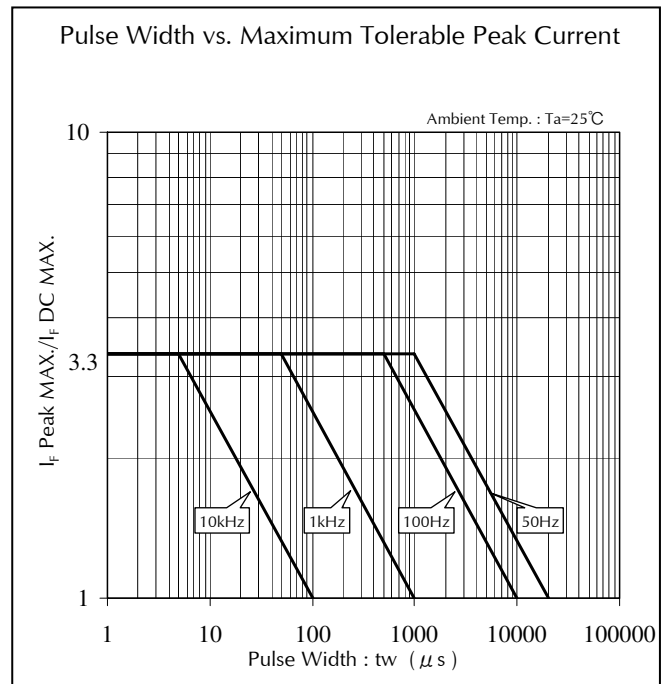
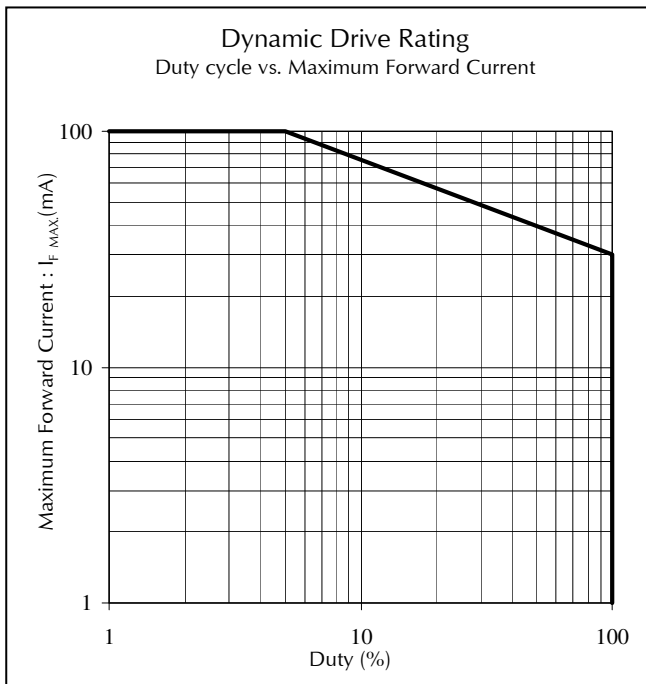
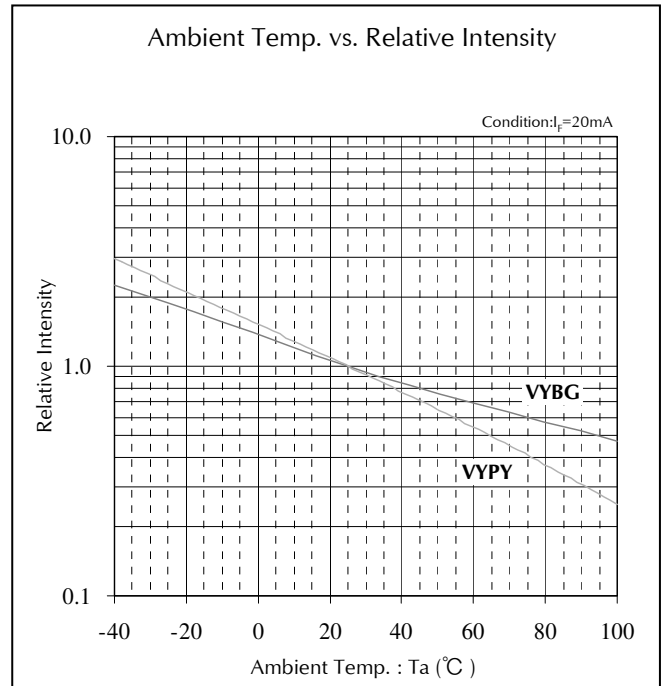
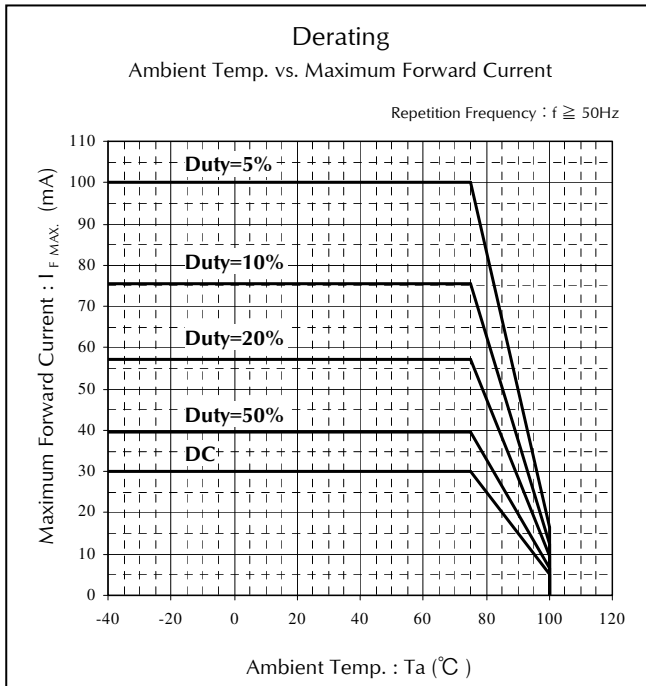
Characteristics Chart (VUB,VUG)



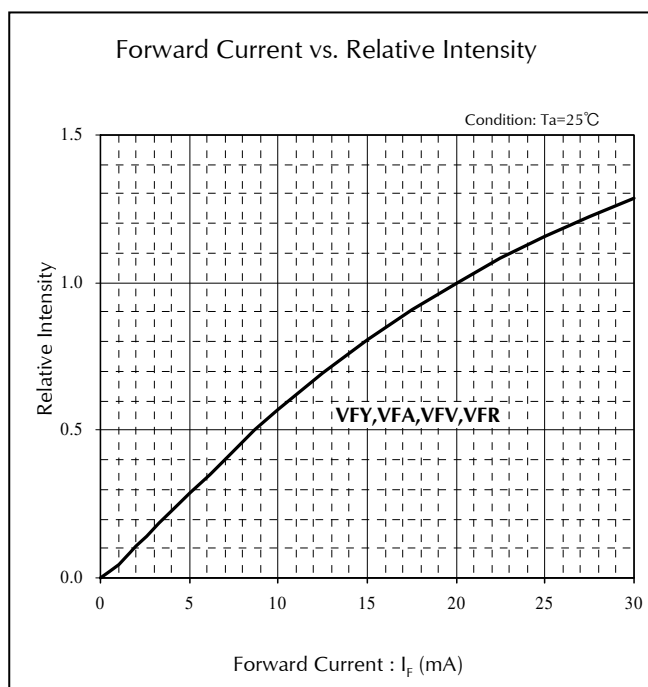
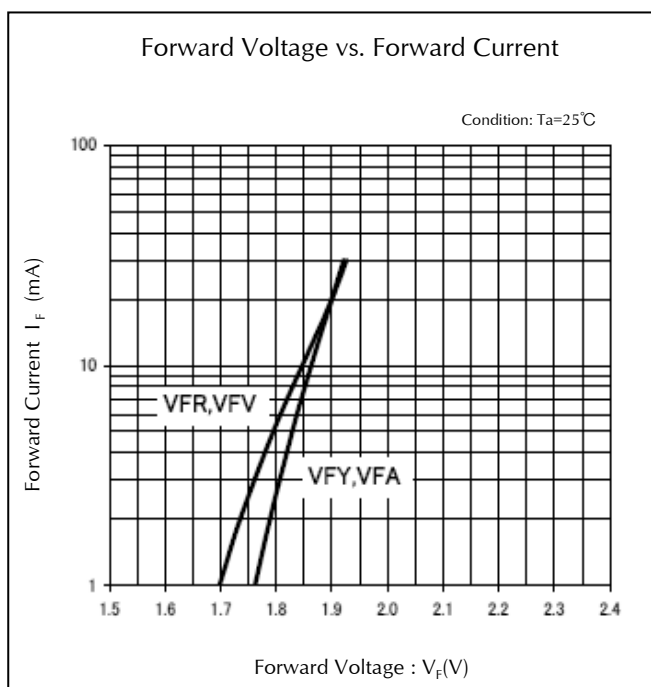
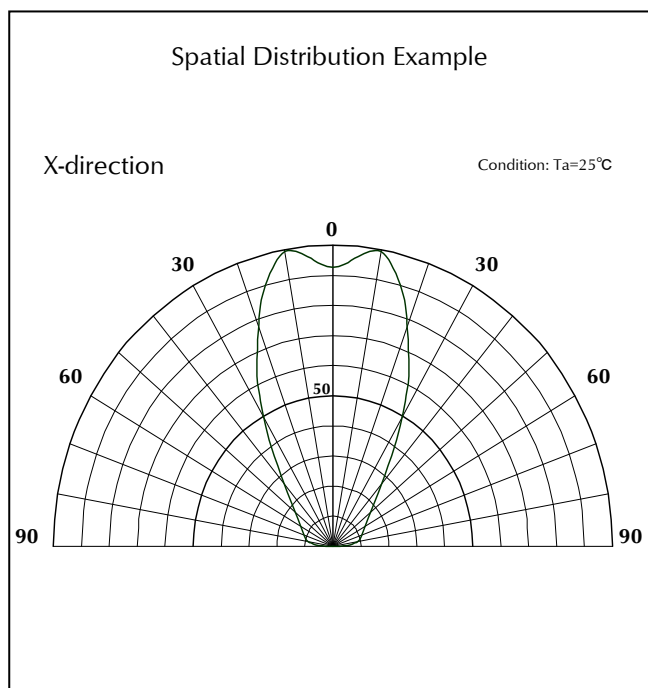
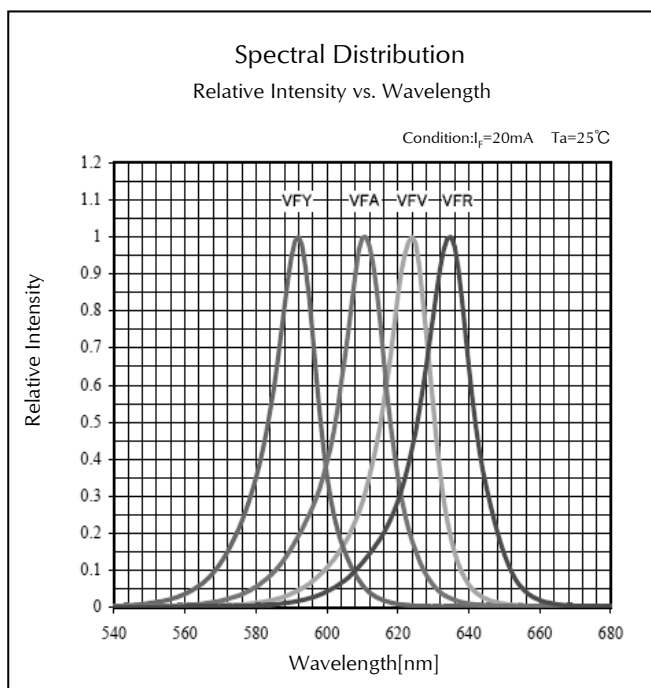
Characteristics Chart (VYBG, VYPY)



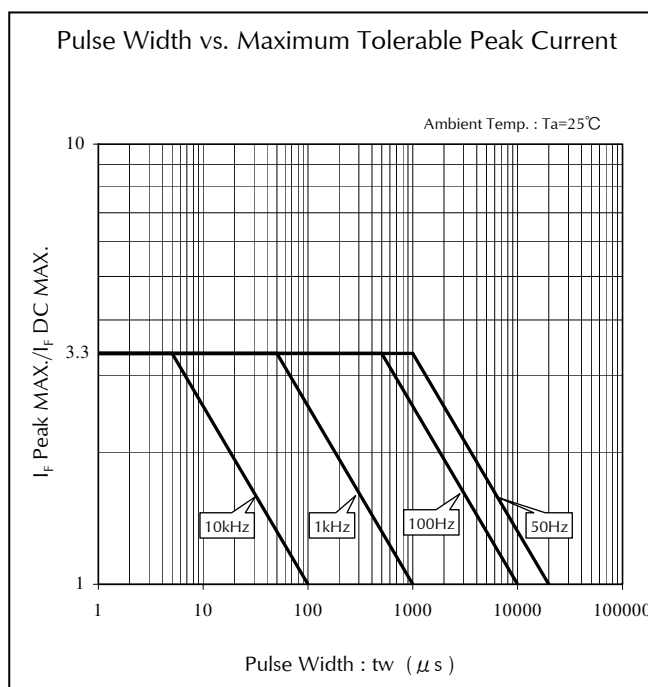
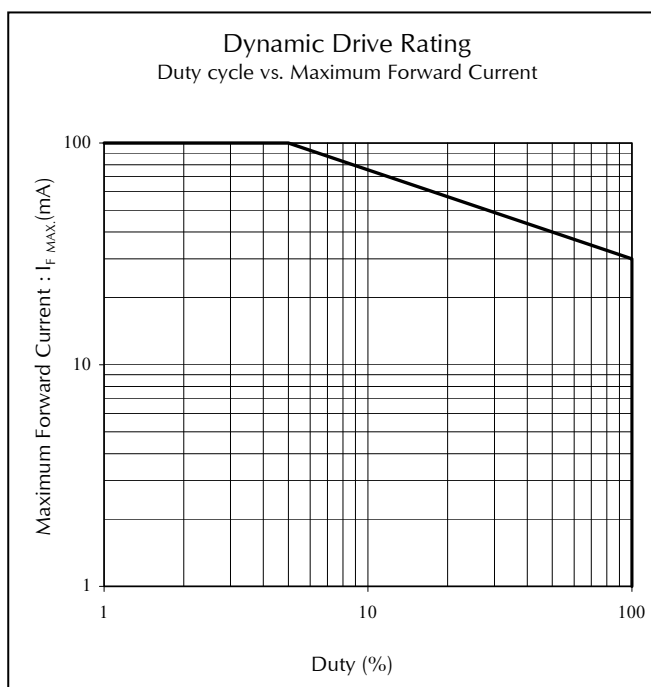
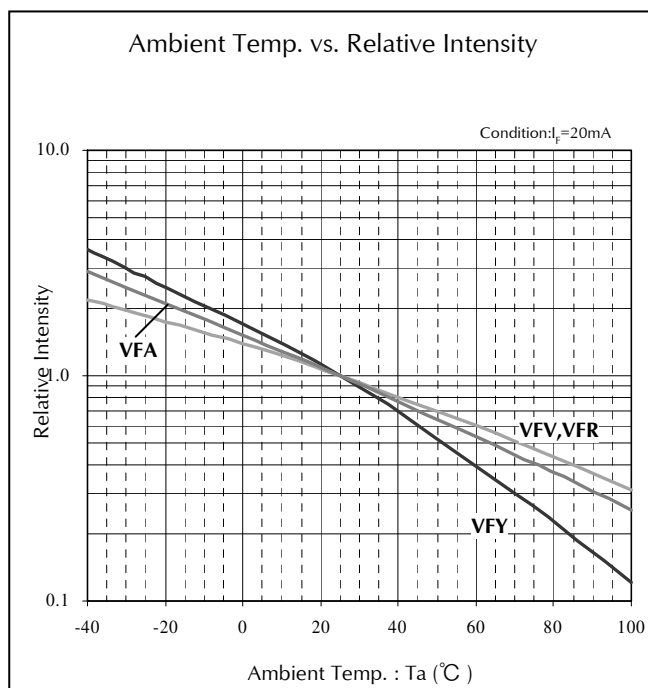
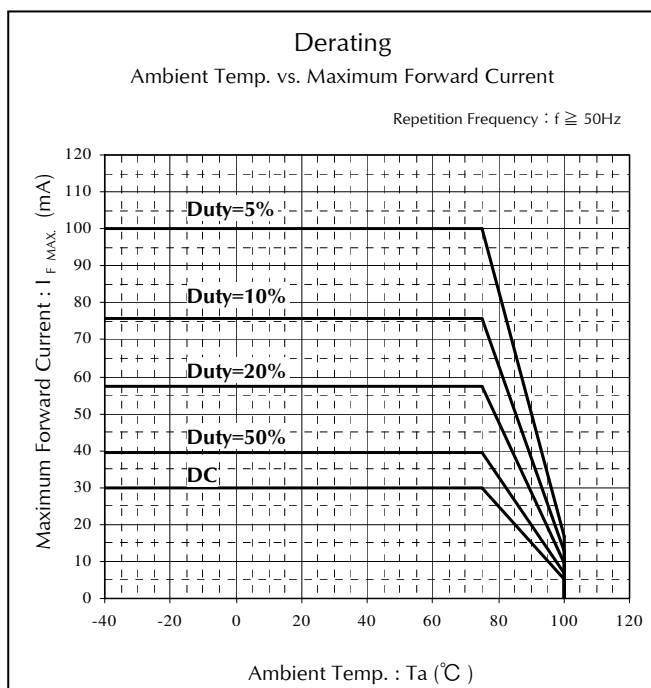
Characteristics Chart (VYBG, VYPY)



Characteristics Chart (VFY,VFA,VFV,VFR)



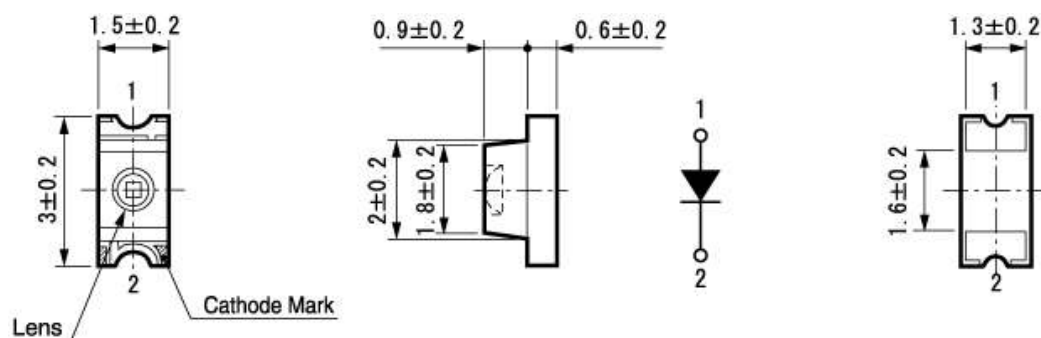
Characteristics Chart (VFY, VFA, VFV, VFR)



Package Dimensions

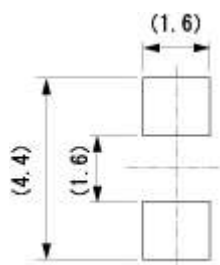
(Unit: mm)

Weight: (7.80)mg



Recommended Soldering Pattern

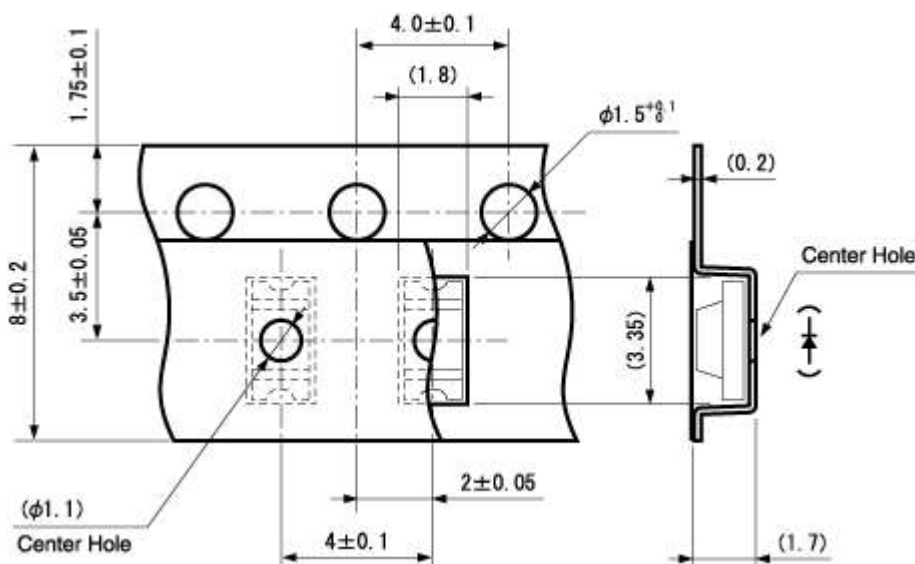
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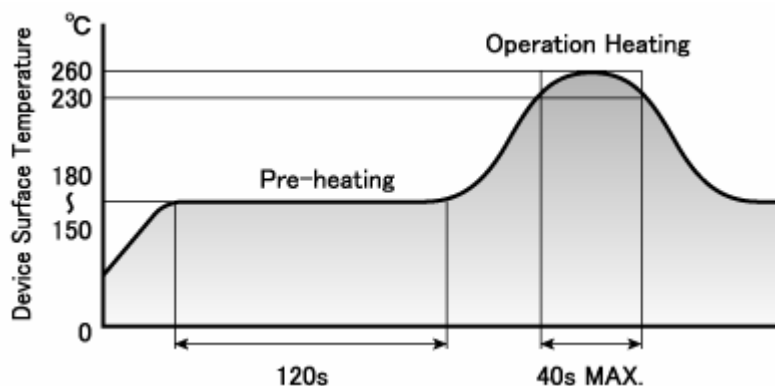
Taping Specification

(Unit: mm)

Quantity: 2,500pcs/ reel(standard)



Reflow Soldering Conditions



- 1) The above profile temperature gives the maximum temperature of the LED resin surface. Please set the temperature so as to avoid exceeding this range.
- 2) Total times of reflow soldering process shall be no more than 2 times. When the second reflow soldering process is performed, intervals between the first and second reflow should be short as possible (while allowing some time for the component to return to normal temperature after the first reflow) in order to prevent the LED from absorbing moisture.
- 3) Temperature fluctuation to the LED during the pre-heating process shall be minimized.

Manual Soldering Conditions

Iron tip temp.	350 °C	(MAX.)
Soldering time and frequency	3 s	(MAX.)
	1 time	(MAX.)

Reliability Testing Result

Reliability Testing Result	Applicable Standard	Testing Conditions	Duration	Failure
Room Temp. Operating Life	EIAJ ED-4701/100(101)	Ta = 25°C, If = Maximum Rated Current	1,000 h	0/20
High Temp. Operating Life	EIAJ ED-4701/100(101)	Ta = Maximum Rated Operating Temperature, If = Derating Value	1,000 h	0/20
Low Temp. Operating Life	EIAJ ED-4701/100(101)	Ta = -40°C, If = Maximum Rated Current	1,000 h	0/20
Wet High Temp. Operating Life	EIAJ ED-4701/100(102)	Ta = 60°C, 90%, If = Maximum Rated Current	1,000 h	0/20
Wet High Temp. Storage Life	EIAJ ED-4701/100(103)	Ta = 60°C, 90%	1,000 h	0/20
Thermal Shock	EIAJ ED-4701/100(105)	Ta = -40°C ~ Maximum Rated Storage Temperature (each 15min.)	1,000 cycles	0/20
Thermal Shock Operating	EIAJ ED-4701/100(105)	Ta = -40°C(off) ~ 85°C (If = Derating Value on), (each 15min.)	1,000 cycles	0/20
High Temp. Storage Life	EIAJ ED-4701/200(201)	Ta = Maximum Rated Storage Temperature	1,000 h	0/20
Low Temp. Storage Life	EIAJ ED-4701/200(202)	Ta = Minimum Rated Storage Temperature	1,000 h	0/20
Cycled Temp. Humidity Life	EIAJ ED-4701/200(203)	Ta = -30°C(2h) ~ 80°C, 95%(2h), 8h/cycle, If = Derating Value, 5min on-off	30 cycles	0/20
Resistance to Reflow Soldering	EIAJ ED-4701/300(301)	Moisture Soak : 30°C, 70%, 72h Preheat : 150 ~ 180°C(120s Max.) Soldering Temp. : 260°C(5s)	Twice	0/20
Electric Static Discharge (ESD) ^{※1}	EIAJ ED-4701/300(304)	C = 100pF, R2 = 1.5KΩ, ±2,000V	once each polarity	0/10
Vibration, Variable Frequency	EIAJ ED-4701/400(403)	98.1m/s ² (10G), 100 ~ 2KHz, 20min, XYZ each direction	2 h	0/10

※1 Reference test

Failure Criteria

Items	Symbols	Conditions	Failure criteria
Luminous Intensity	Iv	If Value of each product Luminous Intensity	Testing Min. Value < Spec. Min. Value x 0.5
Forward Voltage	V _F	If Value of each product Forward Voltage	Testing Max. Value ≥ Spec. Max. Value x 1.2
Reverse Current	I _R	V _R = Maximum Rated Reverse Voltage V	Testing Max. Value ≥ Spec. Max. Value x 2.5
Cosmetic Appearance	-	-	Occurrence of notable decoloration, deformation and cracking

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